

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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SERIAL NO.: 10/539,945

ART UNIT: 3672

FILED: January 17, 2006

EXAMINER: Wright, G. C.

TITLE: APPARATUS FOR THE COOLING OF DRILLING LIQUIDS

Amendment B: REMARKS

Upon entry of the present amendments, previous Claim 3 has been canceled and new independent Claims 4 - 6 substituted therefor. Reconsideration of the rejections, in light of the forgoing amendments and present remarks, is respectfully requested. The present amendments have been entered for the purpose of further distinguishing the present invention from the prior art.

In the Office Action, it was indicated the Claim 3 was rejected under 35 U.S.C. § 102(b) as anticipated by the Mager patent. The drawings were objected to because all of the different lines on the drawing make it hard to distinguish the different elements of the invention.

As an overview to the present reply, Applicant has revised previous independent Claim 3 in the form of new independent Claim 4. New independent Claim 4 expresses the original limitations but positively recites the "closed circuit" that is formed between the first heat exchanging means and the second heat exchanging means. It is now indicated that the "pumping means" is for "circulating the water and glycol mixture in said closed circuit". Applicant respectfully contends that these features serve to distinguish the present invention from the prior art. From this amendment, it is clear that the water/glycol mixture is contained within the closed circuit.

New dependent Claim 5 teaches that the first heat exchanging means has an inlet for receiving warm drilling mud and an outlet for releasing the cooled drilling mud. The inlet and the

outlet are connected at an oil drilling site which uses this drilling mud. The inlet and the outlet are positioned at the drilling site in order to circulate the drilling mud. The basis for this claim can be found in paragraphs [0026], [0032] and [0034] of the original specification.

New dependent Claim 6 claims that the apparatus includes a "sensor means" for detecting oil leakages. The sensor means is provided on the seawater outlet of the second heat exchanging means. The basis for this claim is found in the original specification paragraphs [0017] and [0025] of the original specification.

In the Official Action, previous independent Claim 3, now independent Claim 4 was rejected over the Mager patent because the apparatus, according to the Examiner, is inherently capable of performing the function of the present invention. Applicant respectfully contends that new independent Claim 4 describes an apparatus that comprises two heat exchanging means connected by a closed circuit. The closed circuit comprises a water and glycol mixture therein. The reason is to provide two heat exchanging means instead of one heat exchanging means so as to cool the drilling mud directly. As a result, leakage of oil or drilling mud, and pollution of the seawater, is prevented by separating the flows of drilling mud and seawater.

The Mager discloses an apparatus for converting ocean thermal energy to electrical power. The Mager patent comprises a pair of heat exchanging means and a closed circuit comprising a so-called working fluid which evaporates at the temperature of warm seawater. A turbine is provided for the generation of electrical power. In order for the turbine to operate properly, the working fluid leaving the first heat exchanging means would need to be a gas. This is because the principle of the turbine is to operate by virtue of expansion of gas. If no gas is available to expand, the turbine will not function and no electrical power is generated. In particular, the Mager patent teaches that the

fluid should "evaporate at the temperature of warm seawater" (see columns 6, lines 51 and 52). Although it can be argued that the assembly of a pair of heat exchanging means and the closed circuit connecting them can function without the turbine and without the working fluid evaporating at the temperature of warm seawater, Applicant respectfully contends that the such an apparatus would cool relatively warm seawater with relatively cool seawater and vice versa. There would be no advantageous technical effect in providing such an apparatus. The only meaningful result that would be possible from the Mager patent would be to have a turbine. As such, the Mager patent must have the turbine in order to operate properly.

The Mager patent requires that the fluid in the closed circuit evaporate at the temperature of warm seawater. In contrast, the water and glycol mixture of the present invention does not evaporate at this temperature. As such, even if the Mager patent could operate without the use of turbine, such an apparatus would not be the same as the present invention since a water and glycol mixture is excluded as a working fluid in the closed circuit according to Mager patent. Quite clearly, independent Claim 4 specifies that the closed circuit contains the "water and glycol mixture therein". Since such an element is missing in the Mager patent, the Mager patent cannot anticipate Claim 4 herein.

The Mager patent describes that two flows of seawater are mixed together after the flows have passed their respective heat exchanging means. In contrast, the present invention teaches away from such a function since it is specified that the mixing of flows should be prevented in order to avoid surface water pollution. On this basis, Applicant respectfully contends that independent Claim 4 is not anticipated by the prior art Mager patent. Since the function and results achieved by the present invention are different than that of the Mager patent, Applicant also respectfully contends

that the present invention is non-obvious in view of this prior art reference.

Relative to the drawing objections, Applicant respectfully disagrees with the Examiner. The lines provided in each of the drawings are properly illustrative of the present invention. The lines show the structure of the present invention. Reference numerals, and their associated lead lines, indicate those portions of this structure that pertinent to the present invention as described herein. Applicant respectfully requests that the Examiner reconsider the previous objections to the drawings.

Based upon the foregoing analysis, Applicant contends that independent Claim 4 is now in proper condition for allowance. Additionally, those claims which are dependent upon these independent claims should also be in condition for allowance. Reconsideration of the rejections and allowance of the claims at an early date is earnestly solicited. Since no new claims have been added above those originally paid for, no additional fee is required.

Respectfully submitted,

December 4, 2009
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